

Supporting Information

Enhanced Liquid-liquid Phase Separation of Stress Granules in a Reconstructed Model and Their Cytoplasmic Targeting by a DNA Nanodevice

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200237, China

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yfxu@ecust.edu.cn

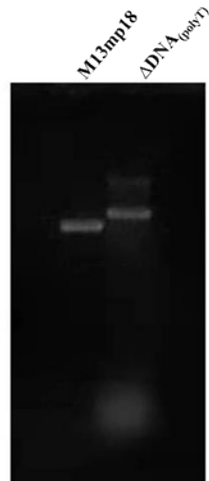


Figure S1. Agarose gel electrophoresis of $\Delta\text{DNA}_{(\text{polyT})}$.

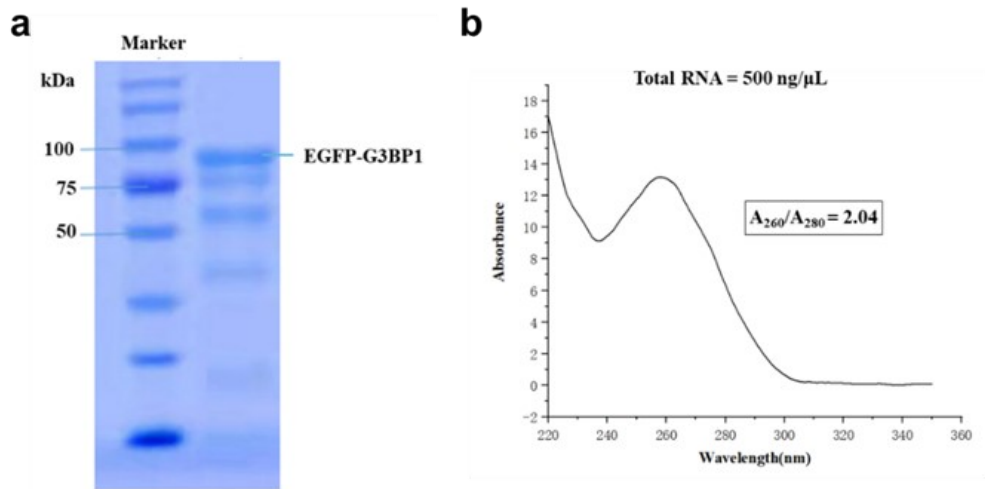


Figure S2. (a) Polyacrylamide gel electrophoresis of EGFP-G3BP1 protein. (b) UV absorption curve of Total RNA.

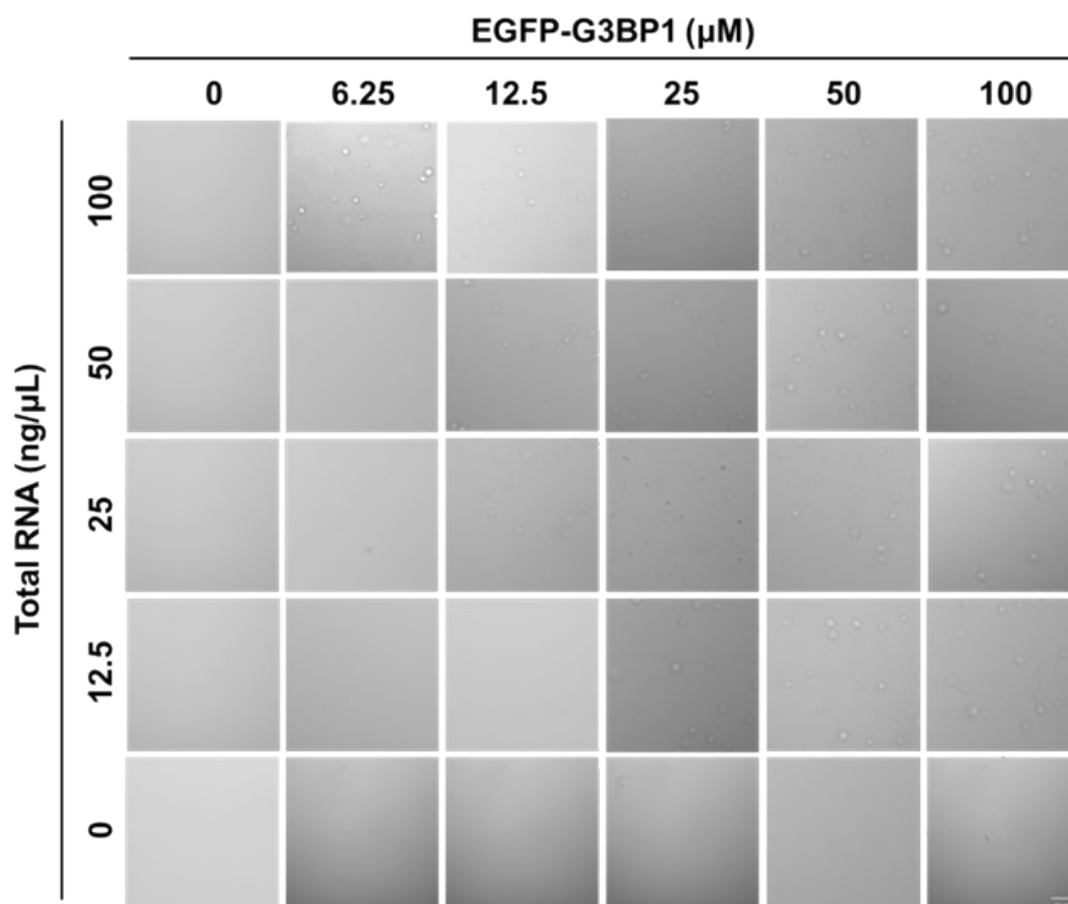


Figure S3. The rSGs is formed by mixing G3BP1 and total RNAs extracted from Hela cells. Scale bar: 10 μm .

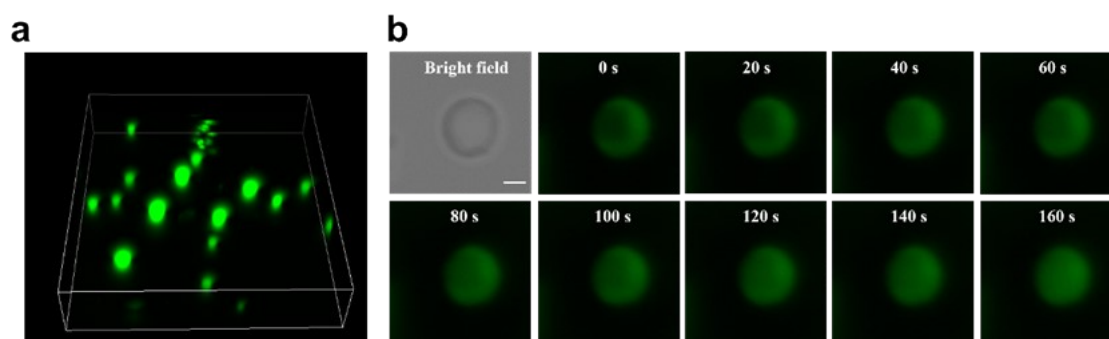


Figure S4. 3D imaging (a) and fluorescence recovery after photobleaching (b) of EGFP-

G3BP1 and Total RNA phase-separated coacervates. Scale bar is 1 μm .

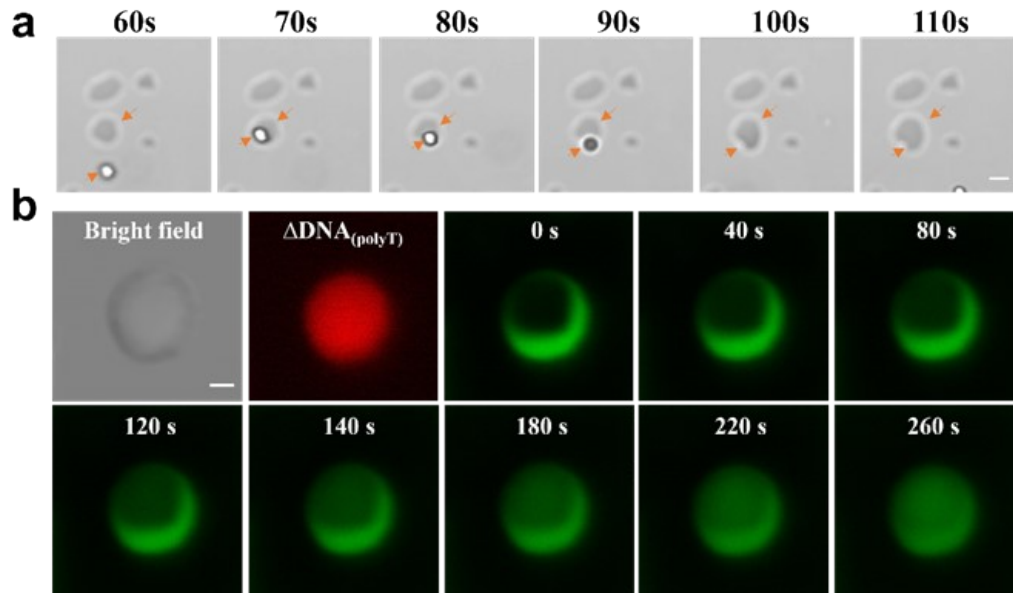


Figure S5. (a) Fusion and (b) fluorescence recovery after photobleaching of $\Delta\text{DNA}_{(\text{polyT})}$, EGFP-G3BP1 and Total RNA phase-separated granules. Scale bars are 1 μm .

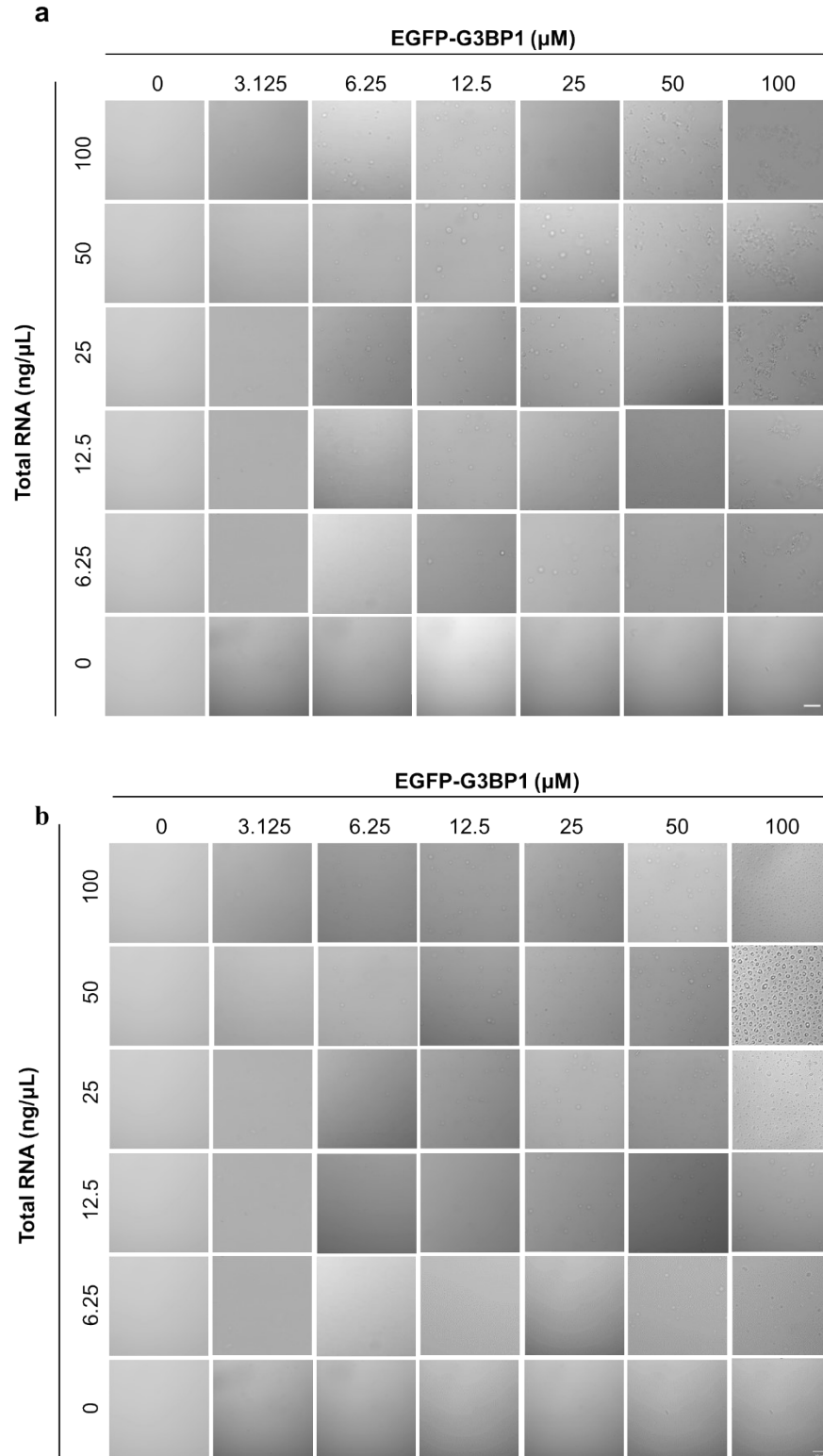


Figure S6. (a) LLPS of rSGs in the presence of $\Delta\text{DNA}_{(\text{polyT})}$ (20 ng/nL). (b) LLPS of rSGs in the presence of $\Delta\text{DNA}_{(\text{nopolyT})}$ (20 ng/nL). Scale bar: 10 μm .

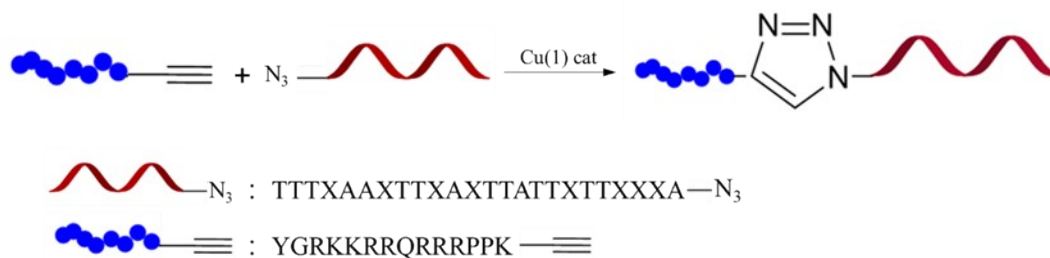


Figure S7. 5'-terminal azido-tethered oligonucleotide (N₃-ODN) undergo azide acetylene cycloaddition reaction with alkyne-modified TAT.

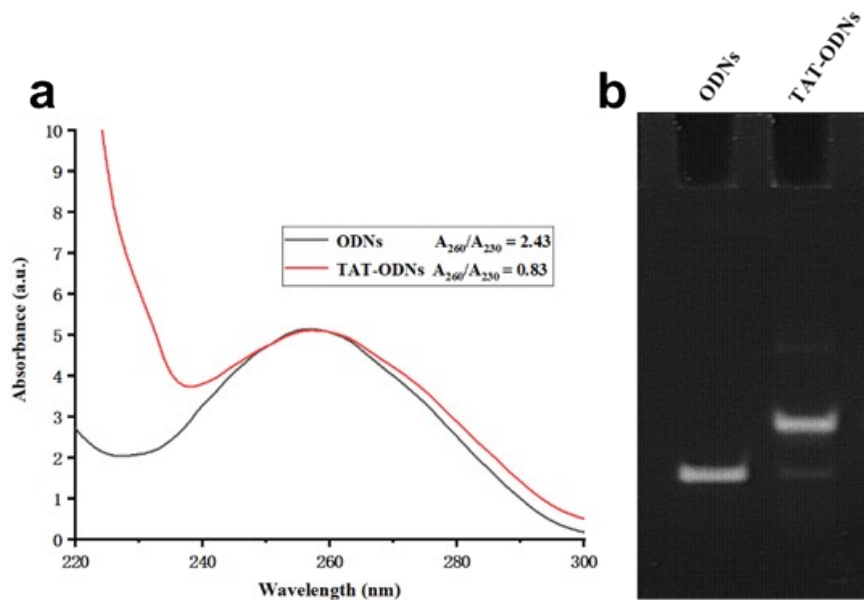


Figure S8. (a) UV absorption curve of ODNs and TAT-ODNs. (b) Denaturing polyacrylamide gel electrophoresis of TAT-ODNs.

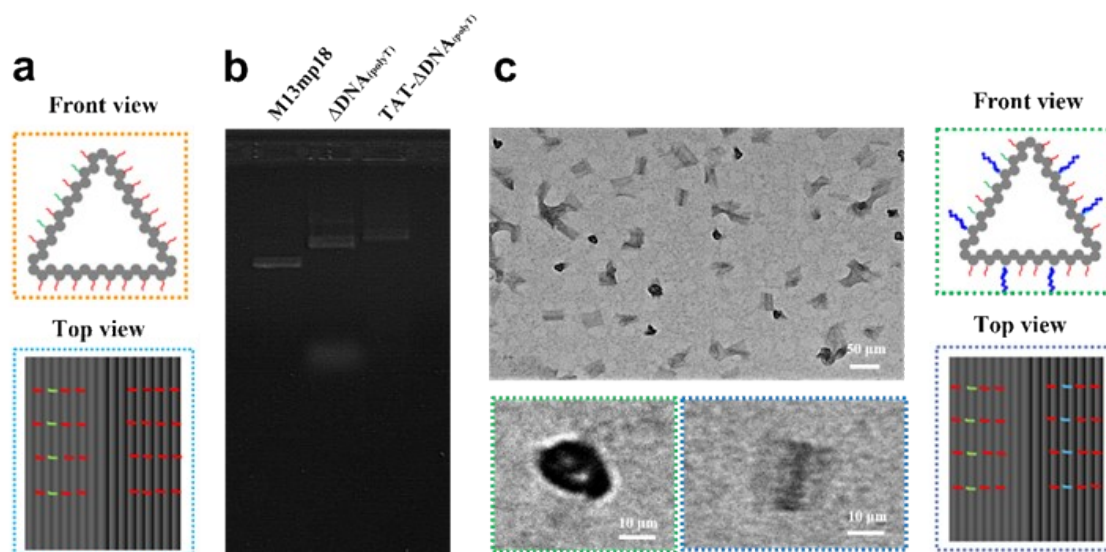


Figure S9. (a) $\Delta\text{DNA}_{(\text{polyT})}$ modification site map with red chains representing modification sites. Agarose gel electrophoresis (b) and TEM images (c) of TAT- $\Delta\text{DNA}_{(\text{polyT})}$.

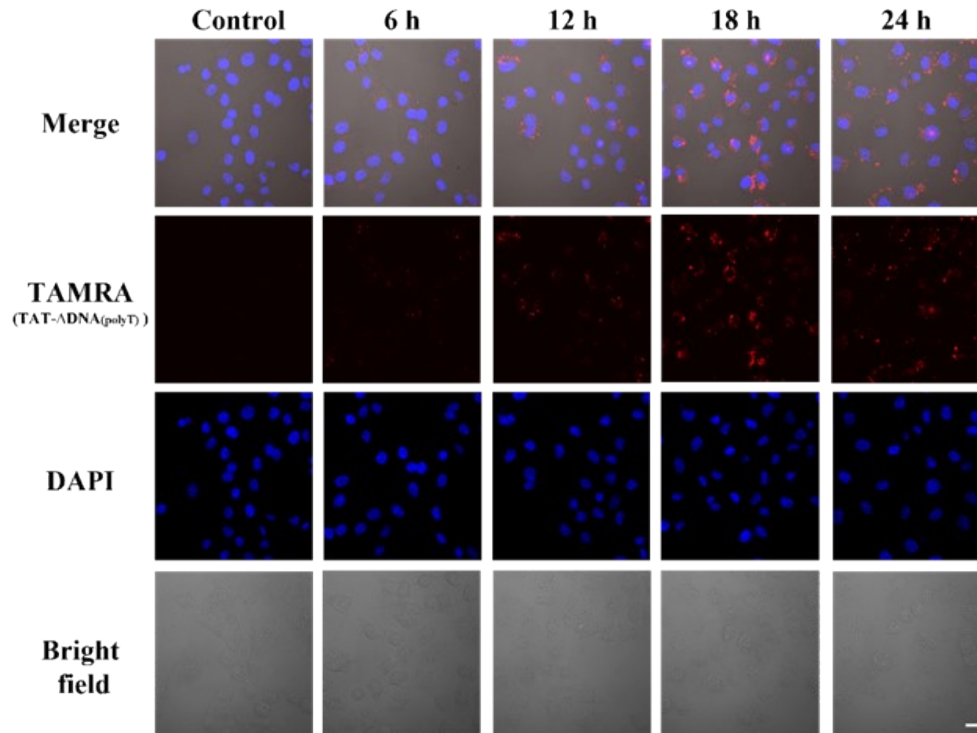


Figure S10. CLSM imaging of TAT- $\Delta\text{DNA}_{(\text{polyT})}$ co-incubated with HeLa cells for 6 h, 12 h, 18 h and 24 h. Scale bar is 20 μm .

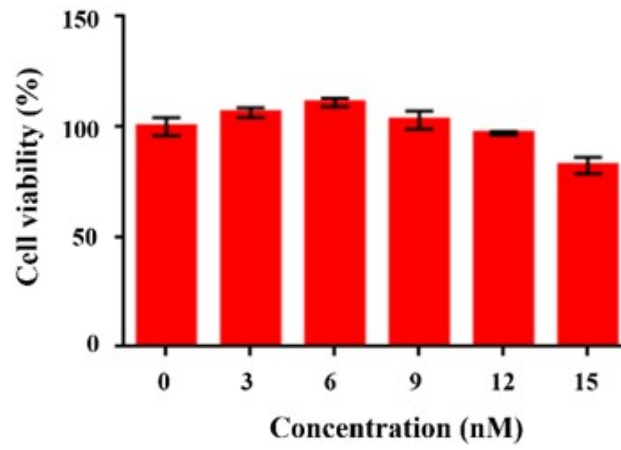


Figure S11. Cell viability of HeLa cells treated with different concentrations of TAT-DNA_(polyT).

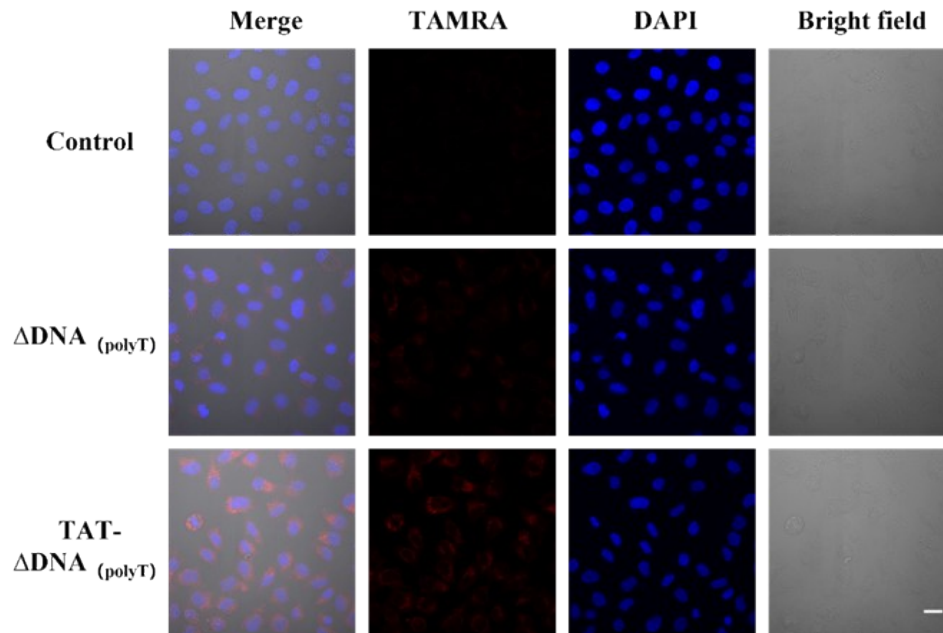


Figure S12. CLSM images of endocytosis of Δ DNA_(polyT) and TAT- Δ DNA_(polyT) in HeLa cell. Scale bar is 20 μ m.

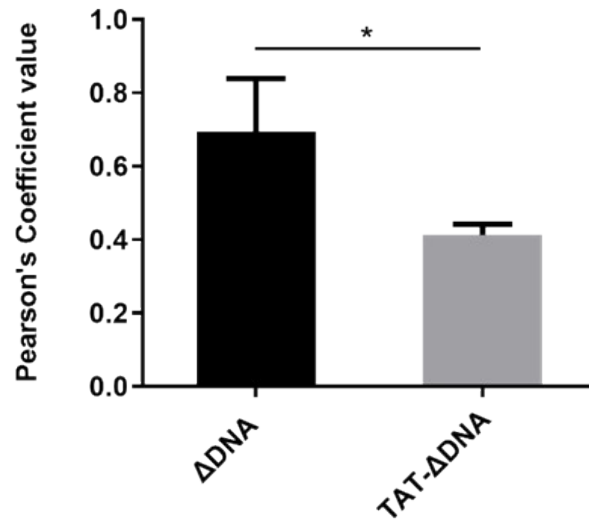


Figure S13. Histogram of Pearson's coefficient value corresponding to confocal images of Δ DNA and TAT- Δ DNA_(polyT) co-localized with lysosome. * $p = 0.05$.

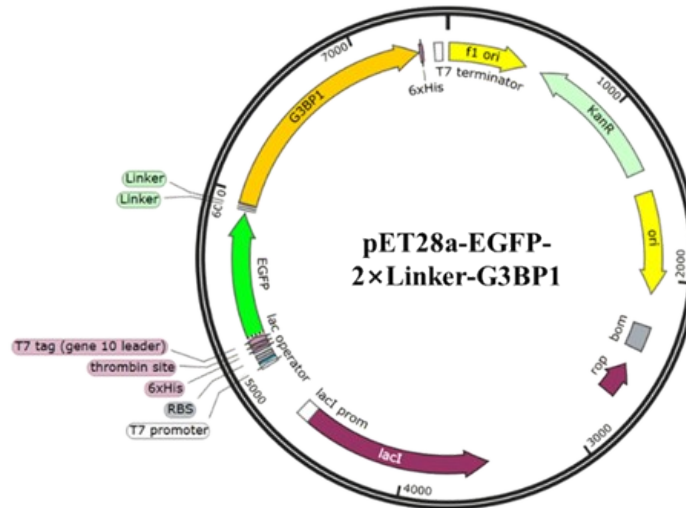


Figure S14. Construction of plasmid of EGFP-G3BP1.

+ 0.5 mM Arsenite

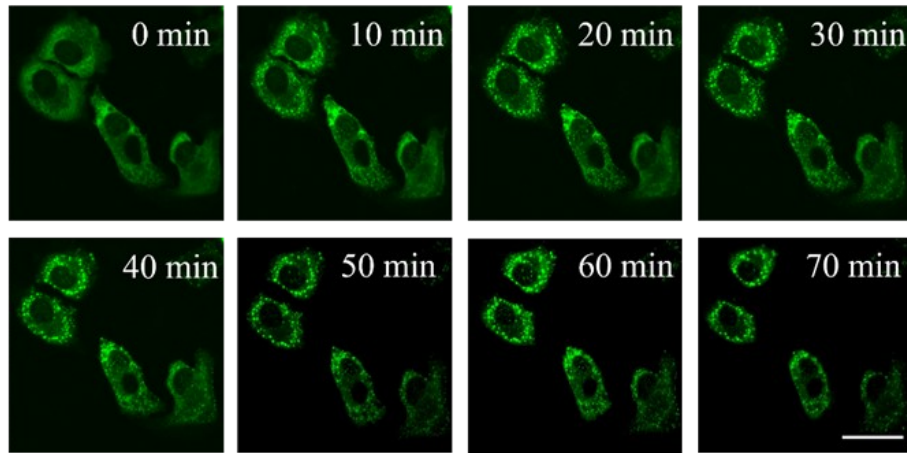


Figure S15. CLSM imaging of EGFP-G3BP1 expression in HeLa cells treated with SGs enhancer sodium arsenite. Scale bar is 20 μ m.

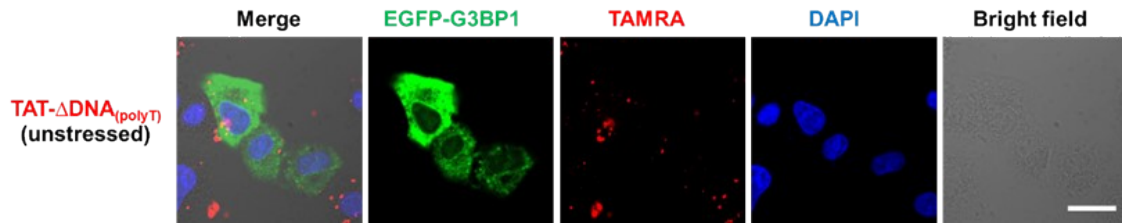


Figure S16. CLSM images of TAT- Δ DNA_(polyT)TAMRA introduced into HeLa cells expressing EGFP-G3BP1. Scale bar is 20 μ m.

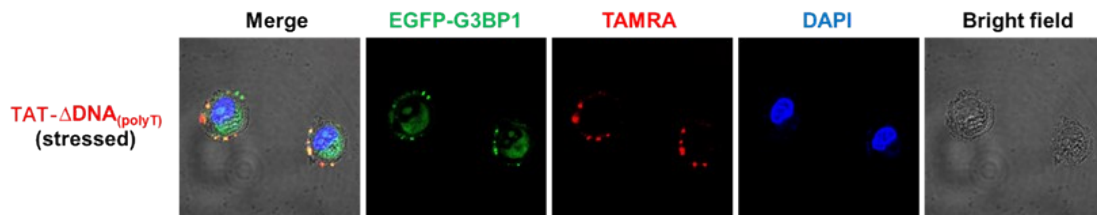


Figure S17. CLSM imaging of TAT- Δ DNA_(polyT)TAMRA colocalized with cytoplasmic SGs in HeLa cells under stressful condition. Scale bar is 20 μ m.

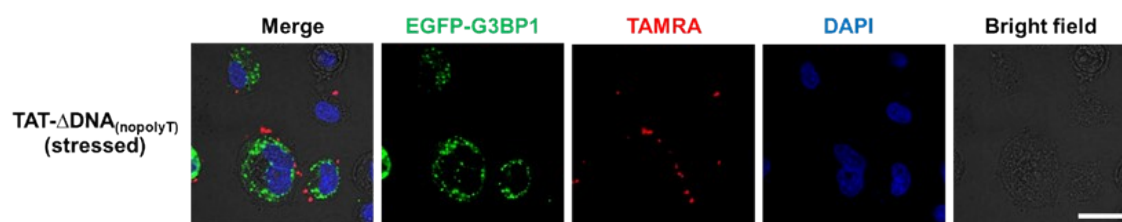


Figure S18. CLSM imaging of TAT- Δ DNA_(nopolyT)TAMRA colocalized with cytoplasmic SGs in HeLa cells under stressful condition. Scale bar is 20 μ m.

Table S1. Sequences of staple strands of Δ DNA_(polyT).

Name	Sequence (5'-3')
1	AAGACGCTCTGTAAATCGTCGACATTATTTTTTTTTTTTTTTTTT
2	TTGAAAATCTCCATTAGACGTTTTTTTTTTTTTTTTTTT
3	AACATGAAAGTAAGGTGAATTTTTTTTTTTTTTTTTTTT
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199 GTTAAAGGCCGCTTAATACGTTTTTTTTTTTTTTTTT
200 TTTGGATAGGAGCGGAATTATATTAAATCCTTTGCATAGATAAAGGAAT

Table S2. Sequences of staple strands of TAT- Δ DNA_(polyT).

Name	Sequence (5'-3')
1	AAGACGCTCTGTAAATCGTCGACATTTATTTTTTTTTTTTTTTTTTT
2	TTGAAAATCTCCCATTAGACGTTTTTTTTTTTTTTTTTTTTT
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